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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/903,709	07/13/2001	Toshihiko Ouchi	35.G2856	9180

5514 7590 11/15/2004

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EXAMINER	
KIM, RICHARD H	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 11/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/903,709	OUCHI ET AL.	
	Examiner	Art Unit	
	Richard H Kim	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-14,17,19-29,31,33-37 and 42-44* is/are pending in the application.

4a) Of the above claim(s) *6,15,16,18,30,32 and 38-41* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-14,17,19-29,31,33-37 and 42-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 5, 8, 11, 17, 19, 20, 22 and 44 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsuda (US 5,434,939).

Referring to claim 1, 19 and 44, Matsuda discloses a device comprising a substrate (see abstract); a surface optical device being arranged on the substrate (see Fig. 1), the surface optical device being capable of emitting or receiving light through a surface of the surface optical device (abstract); a light transmission member optically coupled to the surface optical device (see Fig. 2, ref. 204), and a layer formed of a radiation-curable or electron-beam-curable material (see Fig. 1, ref. 113; col. 4, lines 11-12), in which a guide hole for inserting an end portion of a light-transmission member therein is formed at a position corresponding to the surface of the surface optical device such that the surface optical device can be optically coupled to the light-transmission member inserted in the guide hole (see abstract), wherein the guide hole is formed in the layer (Fig. 1, ref. 113), and wherein the layer is formed directly on a surface of the surface optical device (Fig. 1, ref. 113). As to the product-by-process limitation "by performing a patterning on the layer using photolithography", it has been recognized that "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its

method of production. If the product in the product-by-process claims is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process". *In re Thorpe.* 227 USPQ 964, 966 (Fed. Cir. 1985). See also MPEP 2113.

Referring to claims 5, Matsuda discloses a device wherein the guide hole is contoured corresponding to an outer shape of the light-transmission member (see Fig. 4).

Referring to claim 8, Matsuda discloses a device where the surface optical device comprises a surface-light emitting device only (see Fig. 2, ref. 204).

Referring to claim 11, Matsuda discloses a device wherein the surface light-emitting device comprises a vertical cavity surface emitting laser (see abstract).

Referring to claim 17, Matsuda discloses a device wherein the surface optical device comprises a thinned surface optical device without a growth substrate (see Fig. 2, ref. 204).

Referring to claim 20, Matsuda discloses a device further comprising an electronic device provided on the substrate in a hybrid manner, the electronic device being electrically connected to the surface optical device (see Fig. 1, ref. 102,105,106).

Referring to claim 22, Matsuda discloses a device wherein the light transmission member comprises an optical fiber (see Fig. 1, ref. 112).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Kragle et al. (US 5,574,806).

Matsuda disclose the device previously recited. However, the reference does not disclose that the curable material is polymerizable resist.

Kragle et al. discloses curable material of polyemerizable resist (see col. 5, line 60).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the curable material to be polymerizable resist since one would be motivated to employ a moldable material before curing the material in order to provide a more stable base for the optical fiber. By implementing a moldable material, the layer can be molded to the optical fiber.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Malone (US 6,626,585 B1).

Matsuda discloses the device previously recited. However, the reference does not disclose that the thickness of the layer is in the range between 10 microns to 1000 microns.

Malone discloses a layer in the range between 10 microns and 1000 microns (Fig. 3, ref. 50).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the thickness to be in the range between 10 microns to 1000 microns in order to have the layer thick enough to hold the optical fiber in a stable manner. The thicker the

layer is, the more stably the optical fiber is held. Therefore such a limitation is a result effective variable.

6. Claims 4, 7 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Murata (US 6,568,863 B2).

Referring to claim 4, Matsuda discloses the device previously recited. Matsuda also discloses an upper layer formed on a lower layer with a guide hole for fixing the light-transmission member therein, and a distance between the surface of the surface optical device through which light can be emitted or received (abstract) and an end face of the light-transmission member is regulated by a thickness of the lower layer (see Fig. 2). However, the reference does not disclose that the thick layer comprises a lower layer with a hole with a size of which is smaller than a size of the light-transmission member and which transmits light therethrough.

Murata discloses a lower layer with a hole a size of which is smaller than a size of the light transmission-member and which transmits light therethrough (see Fig. 12, ref. 116).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a lower layer with a hole a size of which is smaller than a size of the light transmission-member and which transmits light therethrough in order to securely hold the fiber within hole. Moreover, such a modification would enable light to be gradually coupled to the optical fiber, thereby minimizing insertion loss.

Referring to claims 7 and 21, Matsuda discloses the device previously recited. However, the reference does not disclose that a plurality of optical devices is arrayed, and a plurality of the guide holes is arrayed corresponding to the arrayed surface optical devices.

Murata discloses a device wherein a plurality of the surface optical devices is arrayed, and a plurality of the guide holes is arrayed corresponding to the arrayed surface optical devices (see Fig. 37).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a plurality of the surface optical devices arrayed, and a plurality of the guide holes arrayed corresponding to the arrayed surface optical devices in order to improve the efficiency of the device by transmitting or receiving more than one optical signal at one time. Moreover, it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. V. Bemis Co.,* 193 USPQ 8.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Minot et al. (US 5,946,438).

Matsuda discloses the device previously recited. Matsuda further discloses the device wherein that surface light emitting device comprises a surface emitting laser with only a function layer including an active layer, a cavity layer (see Fig. 2, ref. 207), and distributed mirror layers sandwiching the active layer (see Fig. 2, ref. 206, 208). However, the reference does not disclose that the mirrors are DBR mirrors.

Minot et al. discloses DBR mirrors sandwiching an active layer (see Fig. 1, ref. 33, 31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ DBR mirrors sandwiching an active layer in order to simplify fabrication. In DBR mirrors, the period grating that produces feedback is removed from the gain regions to simplify fabrication. Therefore, the grating at each end of the active region acts as simple reflectors.

8. Claims 9, 23-29, 33-36, 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Jian (US 6,527,455 B2).

Referring to claim 9, Matsuda discloses the device previously recited. However, the reference does not disclose that the surface optical device comprises a surface light-receiving device only.

Jian discloses a device comprising a surface light receiving device only (see col. 5, lines 54-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the surface optical device comprise a surface light-receiving device only since one would be motivated to detect the characteristics of an optical signal.

Referring to claims 23, 24, 35 and 36, Matsuda discloses the device previously recited. However, the reference does not disclose that the optical fiber is a polymer-containing plastic optical fiber, silica-containing optical fiber, a perfluorinated containing optical fiber or a PMMA-containing optical fiber.

Jian discloses a polymer-containing plastic fiber (see col. 1, lines 25-27).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a polymer-containing plastic optical fiber since one would be motivated to improve the durability of the device by employing a break resistant material. Moreover, since applicant has disclosed a plurality of materials for the optical fiber, it is a non-critical feature of the invention. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have used any desirable and optimal material for the optical fiber.

Referring to claim 25-27, Matsuda discloses the device previously recited. However, the reference does not disclose a resin filling a space between an end face of the optical fiber and the surface optical device, wherein the resin is a curable transparent resin.

Jian discloses a resin filling a space between an end face of the optical fiber and a surface optical device wherein the resin is a transparent resin (see Fig.5, ref. 500).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the device to comprise a resin filling a space between an end face of the optical fiber and a surface optical device, wherein the resin is a transparent resin, in order to improve the coupling efficiency of the device. According to Jain "An epoxy layer is used to directly couple the optical device to the second layer" (see col. 9, lines 43-44). Moreover, it would have been obvious for the resin to be curable in order to avoid leakage of the resin from the device.

Referring to claims 28 and 29, Matsuda and Jian disclose the device previously recited. However, the references do not disclose that the optical fiber contain a lens-shaped end portion, and wherein the lens-shaped end portion of the optical fiber is shaped into a concave portion, and

the concave portion is filled with a resin having a refractive index larger than a refractive index of the plastic optical fiber.

Jian discloses a lens-shaped portion coupled to the end of the optical fiber (see Fig. 6, ref. 650) and wherein the lens-shaped end portion of the optical fiber is shaped into a concave portion (see Fig. 6, ref. 650).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to for the optical fiber to contain a lens-shaped end portion and wherein the lens-shaped end portion of the optical fiber is shaped into a concave portion, and the concave portion is filled with a resin having a refractive index larger than a refractive index of the plastic optical fiber since one would be motivated to improve the coupling efficiency of the device. The lens-shaped portion enables focusing of the light beam to the optical fiber, thereby improving coupling efficiency. Moreover, having the lens shaped portion directly contained as a portion of the optical fiber or disposing it at the end of a resin material as shown in Jian, both invention comprise a focusing element within the path of the light beam between the optical device and optical fiber, and have the lens-shaped portion as part of the optical fiber does not provide a clear added advantage, purpose, or solves a stated problem over the Jian. Therefore, such a modification would be functionally equivalent to improve the coupling efficiency from one optical device to another.

Referring to claim 33, Matsuda and Jian disclose the device previously recited. However, the reference does not disclose that the lens-shaped end portion of the polymer-containing plastic optical fiber is formed by pressing an end face of the optical fiber against a heated concave or convex mold.

As to the product-by-process limitation, it has been recognized that "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not on its method of production. If the product in the product-by-process claims is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process". *In re Thorpe.* 227 USPQ 964, 966 (Fed. Cir. 1985). See also MPEP 2113.

Referring to claim 34, Matsuda and Jian disclose the device previously recited. However, the reference does not disclose that the lens-shaped end portion of the polymer-containing plastic optical fiber is formed by immersing an end portion of the optical fiber in an organic solvent and lifting the end portion from the organic solvent to dry the end portion.

As to the product-by-process limitation, it has been recognized that "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not on its method of production. If the product in the product-by-process claims is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process". *In re Thorpe.* 227 USPQ 964, 966 (Fed. Cir. 1985). See also MPEP 2113.

Referring to claims 42 and 43, Matsuda discloses a method comprising the steps of forming functional layers of surface optical device on a growth substrate (see Fig. 2, ref. 201), forming a plurality of sets of electric wiring patterns of a plurality of respective areas of an implement substrate (see Fig. 2, ref. 106), bonding at least a surface optical device, which is cut from the growth substrate with the functional layers of the surface optical devices, to each respective areas of the implement substrate (see Fig. 3A-3C), forming a layer of radiation-

curable or electron curable material with a guide hole directly on a surface of each surface optical device (see Fig. 2, ref. 218), implementing an electronic device on each respective area of the implement substrate in a flip-chip manner (see Fig. 1, ref. 102, 105, 106), dicing the implement substrate such that the respective areas of the implement substrate are separated from each other (see Fig. 3A-3D); and inserting an optical fiber into each guide hole such that the surface optical device is optically coupled to the light-transmission member inserted in the guide hole (see Fig. 2, ref. 217). However, the reference does not disclose that the layer of radiation curable material is formed using photolithography.

Jian discloses of radiation curable material formed using photolithography (see col. 2, lines 62-67).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the radiation-curable or electron-beam-curable material with a guide hole on each surface optical device using photolithography in order to improve the precision of alignment by defining the desired locations of the fiber sockets (see col. 6, line 62).

9. Claims 10, 12, and 37 rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Kravitz et al. (US 5,790,730).

Referring to claim 10, Matsuda discloses the device previously recited. However, the reference does not disclose the device wherein there is a plurality of surface optical devices and the plurality of the surface optical devices comprise at least a surface light-emitting device and at least a surface light-receiving device.

Kravitz et al. discloses a device wherein there is a plurality of surface optical devices optical devices and the plurality of the surface optical devices comprise at least a surface light-emitting device and at least a surface light-receiving device (see col. 1, line 25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a plurality of surface optical devices and the plurality of the surface optical devices comprise at least a surface light-emitting device and at least a surface light-receiving device in order to improve the versatility of the device by allowing the device to have multiple functions and to perform the functions at one time, thereby further improving the efficiency of the device.

Referring to claim 12, Matsuda discloses a device wherein the surface light-emitting device comprises a vertical cavity surface emitting laser (see abstract).

Referring to claim 37, Matsuda discloses the device previously recited. However, the reference does not disclose that the substrate is formed of a material which has a heat sink function.

Kravitz et al. discloses a device wherein the substrate is formed of a material which has a heat sink function (see col. 6, lines 30-34).

It would have been obvious to one having ordinary skill in the art for the substrate to be formed of a material which has a heat sink function in order to facilitate heat discharge of the substrate, thereby improving the durability of the device

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda and Kravitz et al., in view of Minot et al.

Matsuda and Kravitz et al. disclose the device previously recited. Matsuda further discloses the device wherein that surface light emitting device comprises a surface emitting laser with only a function layer including an active layer, a cavity layer (see Fig. 2, ref. 207), and distributed mirror layers sandwiching the active layer (see Fig. 2, ref. 206, 208). However, the reference does not disclose that the mirrors are DBR mirrors.

Minot et al. discloses DBR mirrors sandwiching an active layer (see Fig. 1, ref. 33, 31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ DBR mirrors sandwiching an active layer in order to simplify fabrication. In DBR mirrors, the period grating that produces feedback is removed from the gain regions to simply fabrication. Therefore, the grating at each end of the active region acts as simple reflectors.

11. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda and Jian, in view of Inokuchi (US 6,332,721).

Matsuda and Jian disclose the device previously recited. However, the reference does not disclose that the space between an end face of the optical fiber and the surface optical device is filled with an inert gas.

Inokuchi discloses a space between and end face of an optical fiber and an optical device is filled with an inert gas (see col. 4, lines 12-14).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the end face of the optical fiber and the surface optical device filled with an inert gas in order to "improve the life span reliability" (see col. 1, lines 15-18).

Response to Arguments

12. Applicant's arguments with respect to claims 1–5, 7-14, 17, 9-29, 31, 33-37 and 42-44 have been considered but are moot in view of the new ground(s) of rejection.

13. Applicant's arguments filed 8/20/04 have been fully considered but they are not persuasive.

14. In response to Applicant's argument that the cited references do not disclose that "the layer made of radiation-curable or electron-beam-curable material and having a guidehole is formed directly on a surface of the surface optical device", Examiner respectfully disagrees. The surface optical device illustrated in Figure 1 includes light-emitting chip 107. Therefore, the layer 113, is formed directly on a surface of the surface optical device. Furthermore, Applicant argues that the adhesive 113 of Matsuda is not formed directly on a surface of the *surface emitting laser* (108). However, the claim only recites "surface optical device". Therefore, Examiner submits that the entire device shown in Figure 1 is a surface optical device and includes element 107.

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard H Kim whose telephone number is (571)272-2294. The examiner can normally be reached on 9:00-6:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard H Kim
Examiner
Art Unit 2871

RHK

TARIFUR R. CHOWDHURY
PRIMARY EXAMINER